

TRAFFIC-RELATED AIR POLLUTION, ASTHMA AND HAY FEVER AT THE AGE OF 11

Ulrike Gehring, *Institute for Risk Assessment Sciences, Utrecht University, The Netherlands*

Alet H. Wijga, *Centre for Prevention and Health Services Research, National Institute for Public Health and the Environment, Bilthoven, The Netherlands*

Paul Fischer, *Centre for Environmental Health Research, National Institute for Public Health and the Environment, Bilthoven, The Netherlands*

Johan C. de Jongste, *Department of Pediatrics, Division of Respiratory Medicine, Erasmus University Medical Center/Sophia Children's Hospital, Rotterdam, The Netherlands*

Marjan Kerkhof, *Department of Epidemiology, University Medical Center Groningen, University of Groningen, Groningen, The Netherlands*

Dirkje S. Postma, *Department of Pulmonology, University Medical Center Groningen, University of Groningen, Groningen, The Netherlands*

Henriette A. Smit, *Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, The Netherlands*

Bert Brunekreef, *Institute for Risk Assessment Sciences, Utrecht University, The Netherlands - Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, The Netherlands*

Background and aim: In the PIAMA-study, we found positive associations between residential exposure to traffic-related air pollution and the incidence and prevalence of asthma and asthma symptoms until age 8. Puberty is an important milestone for the development of asthma and allergy. We therefore extended our previous analyses with three years of follow-up and studied the association between residential exposure to traffic-related air pollution and asthma and hay fever at age 11 years.

Methods: We estimated exposure to NO₂, fine particulate matter, and soot at the birth address by land-use regression models. Associations of exposure to air pollution with questionnaire-reports of diagnoses and symptoms of asthma and hay fever and were explored by multiple logistic regression analysis in approximately 2600 children. Effects were first estimated for all children and then for boys and girls separately by adding a gender-air pollution interaction term to the model.

Results: The participants' median age was 11.3 years (range 10.1-12.8). Overall, air pollution was (marginally) significantly associated with shortness of breath [adjusted odds ratio (95% confidence interval) 1.36 (1.05-1.77) per 3.5 µg/m³ (interquartile range) change in PM_{2.5}] and nocturnal dry cough [1.30 (0.99-1.69)]; doctor-diagnosed hay fever [1.43 (1.03-1.97)], and symptoms of allergic rhinitis [1.25 (0.96-1.63)] during the past 12 months. Associations between PM_{2.5} and these symptoms of asthma were largely limited to girls, while associations with hay fever were found in boys and girls. However, effects of air were not significantly different between boys and girls. Air pollution was associated with doctor-diagnosed asthma in girls [1.72 (1.00-2.96)], but not in boys [0.83 (0.50-1.35)], p-value interaction < 0.05].

Conclusions: Exposure to traffic-related air pollution is positively associated with symptoms of asthma, hay fever and related symptoms at age 11 years. The association with asthma may be stronger in girls than in boys.